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Electronic Warfare Is a Major Factor in Mideast

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The dark art of electronic warfare—so secret that little is written about it—will help decide who wins this latest Arab-Israeli war.

The war communiques from both Cairo and Tel Aviv do tell that Egypt's missiles are pitted against Israel's planes in the battle for the Sinai desert, with losses of Israel's "flying artillery" of utmost concern to Tel Aviv.

But the communiques cannot describe the grim but silent struggle as technocrats on both sides try to give their fighting men the upper hand with modern weapons that can mean the difference between victory and defeat.

And how this part of the war comes out will provide a fresh measure of the relative merits of Russian and American weapons—a crucial measurement in this age when each superpower is hostage to the other's military might.

Egypt is counting on its Soviet-made anti-aircraft missiles—the SA-2 Guideline, SA-3 Goa and SA-6 Gainful—to offset Israel's American-made F-4 and A-4 fighter-bombers as well as some French-supplied aircraft.

Israel is counting on tactics and electronics to keep Egypt's missilemen from knocking down too many of its planes so it can carry out its war plan to rely primarily on firepower from the air.

The SA-2 for high-altitude shooting and the SA-3 for low altitude have been around for so long that Israel has armed itself with electronic counter measures (ECM) to foil them, as did the United States when it came up against the SA-2 in Vietnam.

But the SA-6 is a newer anti-aircraft missile, although Russia paraded it as far back as the May Day Parade of Nov. 7, 1967. So the most challenging part of Israel's ECM battle is foiling this SA-6, an improved version of the low-altitude SA-3.

Starting with the fundamentals of electronic warfare, the "eyes" of today's modern missiles are radar. One type, called acquisition, goes out a long way to search for an invading aircraft and "acquires" it in the form of a blip on a radar scope. Another type tracks the plane and a third guides the missile fired at it—the fire-control radar.

Two basic techniques for fouling up these radars are to fuzz up the gunner's radar screen—like blurring a home television set—or to make the blip he is tracking appear far from its actual location.

But to perform these and lots of other electronic cat-and-mouse tricks effectively, the invader must know a lot about the radar being used against him—such as frequency, power level and width of the pulse.

Israel—and the United States—know those things about the SA-2 and SA-3. Collecting such electronic intelligence (ELINT) was the mission of the USS Liberty, shot up during the six-day war of 1967; the USS Pueblo captured off Wonsan, North Korea, in 1968, and the EC-121 spy plane shot down by North Korea in 1969.

A standard technique is to tape-record these radar signals from anti-aircraft batteries so that specialists back in the laboratory can figure out ways to disrupt them. But, to do this, the enemy tracking and fire control radar must be turned on.

Modern nations for decades have been playing an electronic game of "chicken," such as flying planes at another country's air defenses, to provoke anti-aircraft batteries into turning on their radar so the signals can be recorded.

But this game of chicken costs lives, with the USS Liberty and Navy EC-121 only two of many examples of men killed collecting ELINT.

Israel, if the SA-6 is indeed taking a toll on its aircraft as Pentagon specialists believe, now must collect more ELINT on the SA-6 and design electronic counter-measures against the weapon.

Diving down on an SA-6 battery to record its firing signals would be highly dangerous, if not suicidal, since the missile is shot from close-range like a bullet. Two less costly options are using drones—airplanes without pilots—or capturing an SA-6 and then operating it to unlock its electronic secrets.

Israel does indeed have drones—an adaption of the Ryan target drone made in the United States. The Israeli version is the Ryan 124-I. So that possibility is in reach.

Since the Egyptians apparently have taken the SA-6 with them across the Suez Canal on tracked vehicles, Israeli forces may capture one before long. The SA-2 and SA-3 are also mobile.

The vehicles carrying the anti-aircraft missiles may find it hard going in the sands of the Sinai and stick to one of the three roads near the Egyptian landing site—making it that much easier for the Israelis to steal a missile.

Electronic warfare specialists said yesterday that the SA-6 seems to be more maneuverable than the SA-2 or SA-3. This would mean that the operator guiding the missile with radio signals could achieve more accuracy by adjusting its fins in flight. American pilots

found that the SA-2 could not keep up with them as they dove sharply and took other sudden maneuvers—a shortcoming that helped keep loss rates down to 2 per cent.

The fewer planes Israel loses to the SA-6 and other missiles, the fewer replacement aircraft the United States will have to send. So it is virtually certain that more American ECM equip-

ment to foil the missiles will be in an early shipment of war supplies to Israel. The Soviet Union, will probably send more offsetting equipment to Egypt in hopes of winning the electronic war.

Another front in this grim but little noted war is around the Golan Heights where, informed sources say, Syria is using the Soviet-made SA-7 Strella—a missile which homes in on the heat from a helicopter or airplane engine after being fired bazooka-style by an infantryman.

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